Virtual Study Buddy Platform

Software Requirement Specifications (SRS)

Project Work Phase - ll (ECS899)

Degree

BACHELOR OF TECHNOLOGY (CSE) IBM

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Revision History

Author/ Changes made by	Date	Reason For Changes	Version
<Project ID> Team	DD-MM-YY	initial draft	1.0 draft
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Approved by:

Project Guide Name: Mr. Amit Singh / Mr. Alok Sharma

Signature:

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1 Introduction

The Virtual Study Buddy Platform is designed to revolutionize student collaboration by connecting learners with compatible study partners and providing tools to enhance their study experience. The platform supports matching algorithms, video chat, goal tracking, and resource-sharing features. By leveraging AI-driven recommendations and fostering community engagement, the system aims to create an interactive and supportive environment that promotes effective peer learning and academic success.

1.1 Purpose

The purpose of this Software Requirements Specification (SRS) document is to outline the functional and non-functional requirements for the Virtual Study Buddy Platform. This platform aims to connect students with compatible study partners and provide tools for collaborative learning, goal setting, and resource sharing. It is intended for students, educators, and administrators who wish to enhance learning through peer collaboration.

1.2 Scope of the Work

The Virtual Study Buddy Platform is a web-based system designed to connect students with compatible study partners and provide tools for effective collaboration. The platform's core features include user registration, a matching algorithm, video chat integration, goal tracking, and resource sharing.

In-Scope:

- Matching students based on academic interests, learning styles, and availability.
- Facilitating virtual study sessions through video conferencing.
- Enabling users to set study goals, track progress, and share resources.
- Supporting community engagement through forums and discussion boards.

1.3 Definitions, Acronyms, and Abbreviations

Abbreviation	Description

1.4 References

S#	Reference Details	Owner	Version	Date
1.	Study Buddy Project Synopsis			
2.	IEEE Guide to Software Requirements Specifications			
3.	GDPR Compliance Guidelines			

2 Overall Description

The Virtual Study Buddy Platform connects students with compatible study partners based on academic interests, goals, and availability. It provides tools for collaborative learning, including video chat for real-time sessions, goal tracking, and resource sharing. AI-driven matching ensures personalized study partnerships, while community features like forums promote broader student interaction.

The platform aims to enhance academic productivity by offering a flexible, secure, and user-friendly environment for students to collaborate, track progress, and stay motivated. Its features support personalized learning, accountability, and a supportive community, fostering a dynamic study experience.

2.1 Product Perspective

The Virtual Study Buddy Platform is a self-contained system that facilitates student collaboration. Unlike traditional learning management systems (LMS) or social media platforms, it focuses specifically on connecting students with compatible study partners based on shared academic goals, availability, and learning styles. While similar platforms may offer some collaborative tools, such as video conferencing or study groups, the Virtual Study Buddy Platform integrates AI-driven matching algorithms, goal tracking, and progress monitoring into one seamless experience.

In comparison to platforms like Google Meet or Zoom, which are primarily video conferencing tools, the Virtual Study Buddy Platform adds value by offering a study partner matching system, goal setting, and resource sharing, creating a more tailored experience for academic collaboration.

The platform operates independently but may integrate with external tools for video conferencing (e.g., Zoom or Google Meet), document sharing, and storage (e.g., Google Drive). It provides a fully integrated user experience with AI-backed recommendations and learning support features, which differentiates it from more general-purpose tools.

2.1.1.1 External Interfaces

1. **Video Conferencing API**: To enable study sessions through live video chats.

2. **Cloud Storage**: For file sharing and storing study materials.
3. **Authentication Services**: Integration with external services for a secure user login (e.g., Google, Facebook).

2.2 Product Functions

The Virtual Study Buddy Platform provides the following key functions to enhance the learning and collaboration experience for students:

1. **User Registration and Profile Setup**
   - Allows students to create personal accounts, set up profiles, and provide academic interests, learning goals, and availability. This information feeds into the matching algorithm to connect students with compatible study partners.
2. **Matching Algorithm**
   - Uses AI-driven algorithms to match students based on their academic interests, learning styles, goals, and availability. The system continuously improves its suggestions through user feedback, ensuring better compatibility for future matches.
3. **Video Chat Integration**
   - Enables real-time study sessions through integrated video conferencing tools. Students can share screens, and documents, and collaborate effectively during their study sessions, regardless of geographical location.
4. **Goal Setting and Progress Tracking**
   - Students can set personal academic goals (e.g., complete chapters, prepare for exams) and track their progress over time. Visual aids like graphs and progress bars provide insights into productivity and goal completion.
5. **Resource Sharing**
   - Allows students to share study materials such as notes, PDFs, presentations, and external links with their study partners. A repository organizes shared resources for easy future reference.
6. **Community Engagement**
   - Provides discussion boards and forums where students can ask questions, share advice, and engage with others in the learning community. Students can join study groups or participate in topic-based discussions.
7. **Feedback and Rating System**
   - After each study session, students can rate their study partner and provide feedback on the session's effectiveness. This feedback is used to refine future matching recommendations.
8. **Admin Panel**
   - Provides administrators with the tools to manage user accounts, monitor platform activity, and ensure the smooth operation of the system. The admin panel also includes reporting tools and the ability to moderate content.

2.3 User Characteristics

The Virtual Study Buddy Platform is designed for students at various educational levels, from high school to university, to enhance peer-to-peer learning and collaboration. The platform will be used by students with different levels of academic experience, learning styles, and technical proficiency.

1. **Educational Level**
   Users will primarily be students from secondary education (high school) to tertiary education (university). These students will vary in terms of academic disciplines, study goals, and schedules, but all will share the need for academic collaboration. The platform will need to cater to a broad range of subjects, including both humanities and STEM fields, ensuring the matching system is versatile.
2. **Experience**
   Users may have varying levels of experience with online learning and collaboration tools. Some may be familiar with digital learning environments, while others may be new to using online platforms for academic collaboration. As such, the platform must be intuitive and user-friendly to accommodate both experienced tech users and those with limited exposure to online educational tools.
3. **Technical Expertise**
   The platform must accommodate a wide range of technical skills. While many students will have basic digital literacy (e.g., using web browsers, and word processors), some may be less comfortable with more advanced features such as video conferencing or resource sharing. The system should be designed with simplicity in mind, prioritizing ease of navigation and clear instructions for
   non-technical users, while still offering powerful features for more experienced users.
4. **User Interface (UI) and Experience (UX) Considerations**
   Given the diverse user base, the platform's UI should be simple, clean, and highly responsive. The design should minimize complexity while still providing all necessary functionalities. The design must support cross-device usage, ensuring compatibility on smartphones, tablets, and desktops to accommodate students with varying access to technology.
5. **Motivation and Goals**
   The platform will serve students who are motivated to improve their learning through collaboration. Many will use the platform for goal-setting and tracking academic progress, seeking partners who can help them stay on track. Others may be looking to engage in a community of learners to share resources and advice. The platform should facilitate a sense of community and support, making it easier for users to find meaningful interactions and stay engaged with their academic goals.

2.4 General Constraints

The Virtual Study Buddy Platform operates within several constraints that will shape its design, development, and deployment:

1. **Regulatory Policies**
   The platform must comply with data privacy and protection laws, including regulations such as the General Data Protection Regulation (GDPR) for users in the European Union. It will ensure secure data storage, user consent for data collection, and transparency in data usage. The

The platform must also adhere to relevant educational regulations for data handling and privacy in the regions it operates.

2. **Hardware Limitations**
   While the platform will be web-based, it must account for varying hardware capabilities among users. The system should be optimized to run efficiently on devices with different specifications (e.g., older smartphones, and low-end computers) to ensure broad accessibility without compromising performance. Additionally, it should support low-bandwidth environments for video conferencing features.
3. **Interface to Other Applications**
   The platform must integrate with third-party applications and services, such as video conferencing tools (Zoom, Google Meet) and cloud storage platforms (Google Drive, Dropbox). These integrations must be seamless and secure, with clear APIs to manage data exchange between systems while maintaining user privacy and system stability.
4. **Parallel Operation**
   The system should support parallel user interactions, such as multiple users being able to engage in separate study sessions, each involving different study partners. This requires the platform to handle multiple simultaneous connections without performance degradation, ensuring that the system can support hundreds or even thousands of active users.
5. **Audit Functions**
   An audit trail of key user activities, such as profile creation, study session initiation, and resource sharing, must be maintained for security and compliance purposes. These logs should be available to system administrators for monitoring and troubleshooting, ensuring that the platform is being used appropriately.
6. **Control Functions**
   The platform will include administrative control functions that allow platform moderators to manage user accounts, including the ability to suspend or terminate accounts in cases of inappropriate behavior. Moderators will also have the ability to manage content in forums or discussion boards, ensuring that the community remains productive and respectful.
7. **Higher-order Language Requirements**
   The platform will be developed using modern web technologies, including JavaScript (React.js for the front-end), Python (for back-end logic), and SQL (for database management). These languages will ensure scalability and maintainability while supporting the platform's functionality.
8. **Signal Handshake Protocols**
   The platform will need to support secure and reliable communication protocols, particularly for real-time communication features (e.g., video chat). Protocols such as Secure WebSocket (WSS) and HTTPS will be used for encryption and ensuring a stable, secure connection for users during live sessions.
9. **Reliability Requirements**
   The platform must meet a reliability target of 99.9% uptime, meaning it should be available for use with minimal disruptions. Regular backups of user data and system settings will be conducted, and downtime will be minimized during maintenance periods.
10. **Criticality of the Application**
    While the platform is not mission-critical, it is important for students' academic success. Any downtime or technical issues, particularly during peak study periods (e.g., exam seasons), may impact the effectiveness of the platform. Therefore, high system availability and a robust support system are necessary.

11. **Safety and Security Considerations**
    The platform must prioritize user safety and security. This includes secure user authentication (e.g., multi-factor authentication), data encryption for user privacy, and measures to protect against unauthorized access. It must also include options for users to control what personal information is shared with other users or within the broader community, especially in the context of online interactions and resource sharing.

2.5 Assumptions and Dependencies

The following assumptions and dependencies will influence the development and operation of the **Virtual Study Buddy Platform**:

1. **Internet Connectivity**
   It is assumed that users will have access to reliable internet connections for using the platform's features, particularly video conferencing and real-time collaboration tools. Poor internet connectivity may affect the performance of video calls, data syncing, and resource sharing, potentially requiring design adjustments in the future.
2. **Device Availability and Compatibility**
   The platform assumes that users will access it through modern web browsers on devices (PCs, laptops, tablets, and smartphones) with sufficient processing power and memory. The design will need to adapt for low-end devices or those with limited hardware capabilities, ensuring a smooth experience across various platforms.
3. **Third-party Integrations**
   The platform will rely on external services for certain functionalities, such as video conferencing APIs (e.g., Zoom, Google Meet), cloud storage (e.g., Google Drive, Dropbox), and authentication services (e.g., Google, Facebook login). Any changes or disruptions in these services could impact the functionality of the platform and may require updates or alternative solutions.
4. **Data Storage and Privacy Regulations**
   It is assumed that the platform will comply with relevant privacy laws (e.g., GDPR for European users) and data protection regulations in the regions where the platform operates. Any changes in these regulations may require adjustments to the system's data handling practices and security measures.
5. **User Behavior**
   The platform assumes that users will engage with the system in good faith, creating profiles that accurately reflect their academic interests and goals. If there is a high volume of fraudulent or misleading data, the matching algorithm and overall user experience may need additional safeguards.
6. **Server Availability and Hosting**
   The platform will rely on third-party cloud hosting services (e.g., AWS, Heroku) for scalability and performance. Any changes in service availability or the introduction of new hosting environments could require modifications to the platform's backend infrastructure.
7. **Security Standards**
   It is assumed that the platform will adhere to the latest security standards, including encryption protocols for data transmission and secure user authentication. Any major security vulnerabilities or updates to encryption standards may require immediate updates to the platform's security measures.
8. **Scalability Requirements**
   The platform assumes an initial user base of students from high schools and universities. The

Platforms will need to scale efficiently as the user base grows, with a reliable backend system that can handle increasing traffic and user data. The system must be prepared for high user concurrency, especially during peak academic periods (e.g., exams, and semester starts).

3 Specific Requirements

This section details the software requirements for the Virtual Study Buddy Platform, outlining the functionality required for the system to meet its design goals. It includes input, processing, and output details for each function, as well as error-handling procedures and associated test cases. These details will guide the design, development, and testing of the system.

3.1 < User Registration and Profile Setup>

3.1.1 Description

The User Registration and Profile Setup function allows a new user to create an account on the platform. During registration, the user provides basic personal information, including their name, email address, academic interests, and availability. This function also includes the ability for users to update and modify their profiles after initial registration.

3.1.2 Inputs

- **Name**: The user's full name.
- **Email Address**: The user's unique email address for registration.
- **Academic Interests**: Subjects or topics the user is interested in.
- **Learning Goals**: The user's study goals, such as preparing for exams or completing assignments.
- **Availability**: The user's available hours for study sessions.
- **Password**: For securing user accounts.

3.1.3 Processing

- The system will validate the user's email format and check for existing accounts.
- User data (name, email, academic interests, etc.) will be stored in the **User Table** in the database.
- The registration system will trigger a confirmation email to verify the user's email address.
- Upon confirmation, the user will be prompted to set up additional profile information (if required).

3.1.4 Outputs

- A confirmation message upon successful registration.
- An email verification message is sent to the user.
- A link to the profile setup page after email verification.

3.1.5 Error Handling

- If required fields (such as email or name) are missing, the system will display an error message prompting the user to fill in the missing fields.

- If the email format is invalid, the system will display an error message asking the user to enter a valid email address.
- If a user tries to register with an existing email, the system will display an error message indicating the email is already in use.

3.1.6 Test Cases for <Function 1>

Test Case ID	Test Title	Test Case Description	Pre-condition, if any	Expected Results
TC001	Registration with Valid Details	Verify that a user can successfully register with valid details	The user is not logged in.	The user should see a confirmation message and be redirected to profile setup.
TC002	Registration with Missing Fields	Verify error when required fields are missing	The user is on the registration page.	The system should prompt for missing fields (e.g., name, email).
TC003	Registration with Existing Email	Verify error when registering with an existing email	The email already exists in the database.	The system should display an error message indicating the email is already in use.

3.2 < Matching Algorithm>

3.2.1 Introduction

The Matching Algorithm function is designed to match students with compatible study partners based on their academic interests, learning goals, and availability. The system will continuously refine its suggestions based on user feedback and interaction history.

3.2.2 Inputs

- **User Profile Data**: Includes academic interests, learning goals, and availability.
- **User Feedback**: Previous feedback ratings from study sessions.
- **Availability Schedule**: The user's available hours for study sessions.

3.2.3 Processing

- The system will use an AI-based algorithm to compare users' profiles for compatibility.
- The system will prioritize compatibility in academic interests, study goals, and availability to suggest matches.
- User feedback from previous sessions will be used to adjust future recommendations.

- The system will present users with a list of compatible study partners.

3.2.4 Outputs

- A list of suggested study partners with compatibility scores.
- Notifications or recommendations displayed to the user about their potential study partners.

3.2.5 Error Handling

- If no compatible study partners are found, the system will prompt the user to update their profile or availability.
- If there is an issue with the matching algorithm, a fallback suggestion or alternative method will be provided.

3.2.6 Test Cases for <Function 2>

Test Case ID	Test Title	Test Case Description	Pre-condition, if any	Expected Results
TC004	Match with Similar Profiles	Verify that two users with similar profiles are matched correctly	The user has a complete profile with academic interests and availability.	The system should suggest study partners based on the highest compatibility.
TC005	No Match Found	Verify the system's response when no match is available	The user's profile has limited or no common interests.	The system should prompt the user to update their profile for better match suggestions.
TC006	Match Suggestions Based on Feedback	Verify that past feedback influences future partner suggestions	The user has provided feedback for previous study sessions.	The system should suggest new partners with better compatibility based on feedback.

3.3 Design Constraints

The Virtual Study Buddy Platform operates under several design constraints that will influence its architecture, development, and deployment:

1. **Cross-Browser Compatibility**
   The platform must be designed to function across the latest versions of major web browsers, including Google Chrome, Mozilla Firefox, Safari, and Microsoft Edge. The design should ensure that the platform functions consistently and performs well across different browsers, considering variations in HTML, CSS, and JavaScript support.
2. **Responsive Design**
   The platform must be fully responsive, providing an optimized experience across multiple devices, including desktops, laptops, tablets, and smartphones. This ensures users can access and use the platform efficiently from various screen sizes and devices.
3. **Third-Party API Integration**
   The system will rely on third-party APIs for key functionalities, such as video conferencing tools (e.g., Zoom, Google Meet) and cloud storage services (e.g., Google Drive, Dropbox). These APIs will need to be integrated seamlessly, and their limitations or updates must be managed appropriately to ensure compatibility with the system.
4. **Data Privacy and Security Regulations**
   The platform must comply with relevant data protection and privacy regulations, including the General Data Protection Regulation (GDPR) for users in the European Union and other regional privacy laws. This includes ensuring secure storage of user data, data encryption, and implementing proper authentication and authorization mechanisms.
5. **Server and Hosting Constraints**
   The platform will be hosted on cloud infrastructure (e.g., AWS, Google Cloud, or Heroku), ensuring scalability and reliability. Server resource limitations, including storage capacity, compute power, and network bandwidth, must be considered to handle concurrent users and large volumes of data, especially during peak usage times like exams or study seasons.
6. **Performance Constraints**
   The platform must meet specific performance requirements, including supporting up to 1,000 concurrent users without significant delays or system slowdowns. The video chat feature must also maintain high quality, even in environments with limited bandwidth. Performance optimization techniques, such as lazy loading and caching, should be used to enhance the user experience.
7. **Security Constraints**
   The system must implement robust security measures, including SSL/TLS encryption for all data transmissions, two-factor authentication (2FA) for login, and secure data storage practices. The design should also include mechanisms for handling potential security vulnerabilities related to third-party integrations.
8. **UI/UX Consistency**
   The platform should adhere to established UI/UX design principles for ease of use, accessibility, and a clean user interface. This includes maintaining consistent design elements, clear navigation paths, and intuitive workflows that cater to a diverse user base with varying levels of technical expertise.
9. **Hardware Limitations**
   The platform must be optimized for performance on a variety of devices, including older smartphones and low-end computers. The video conferencing feature, in particular, must

be optimized to function well even with limited hardware resources, such as slower processors or lower-quality cameras.

10. **Scalability and Future Growth**
    The platform should be designed with scalability in mind to accommodate future growth, such as an increase in the number of users, additional features (e.g., mobile app development), or new third-party integrations. Cloud services must be able to scale dynamically to meet demand.
11. **Time and Budget Constraints**
    The project must be developed and deployed within the given timeframe and budget constraints. This will require careful prioritization of features and resources to ensure key functionalities are delivered on time without compromising system performance or security.

None of these constraints are meant to restrict the development of the platform but to guide decisions regarding architecture, design, and implementation, ensuring the system meets both functional requirements and performance standards.

References

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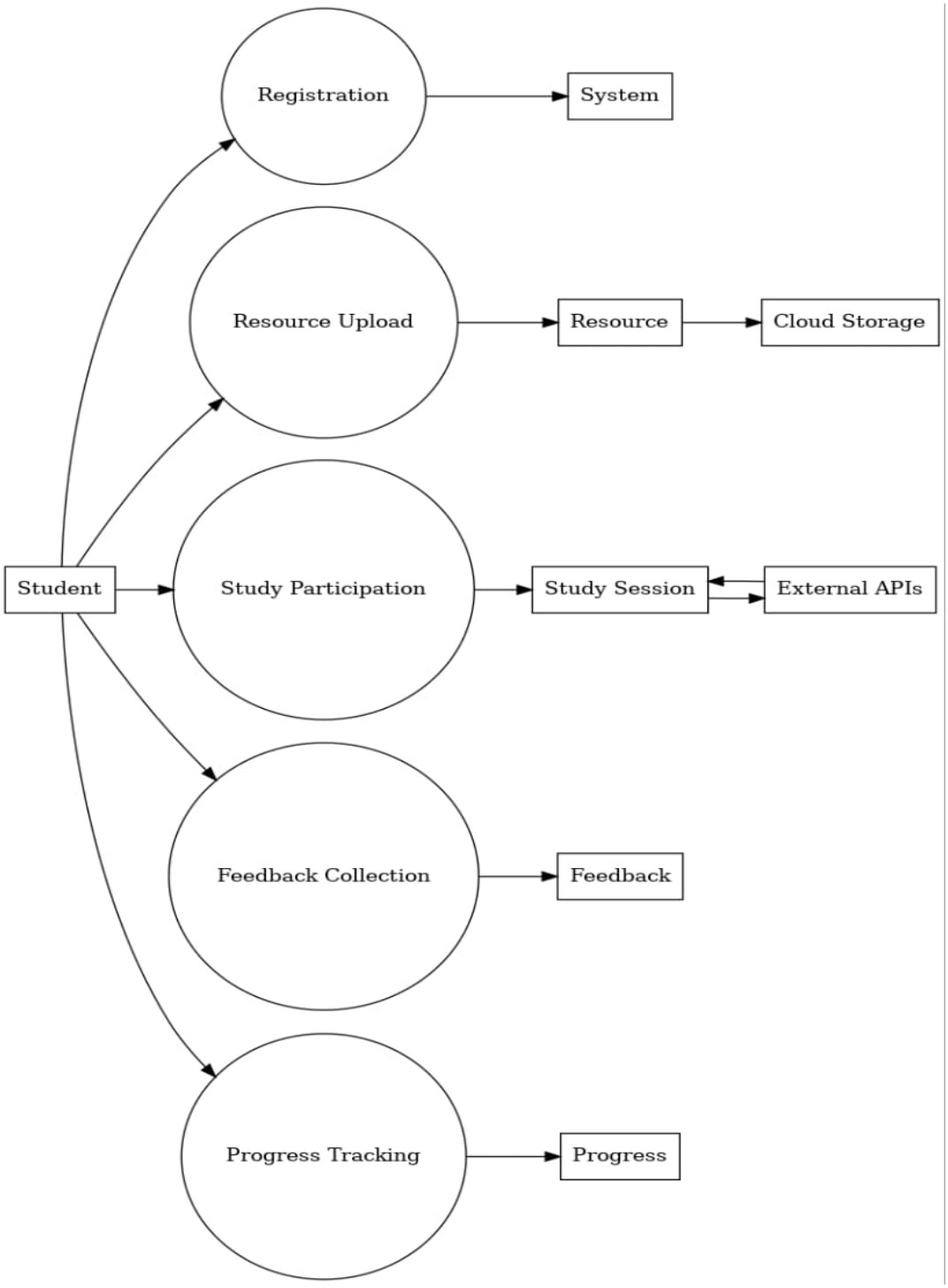
2. Anderson, T. (2003a). Getting the mix right again: An updated and theoretical rationale for interaction. International Review of Research in Open and Distance Learning, 4. Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/149/230.

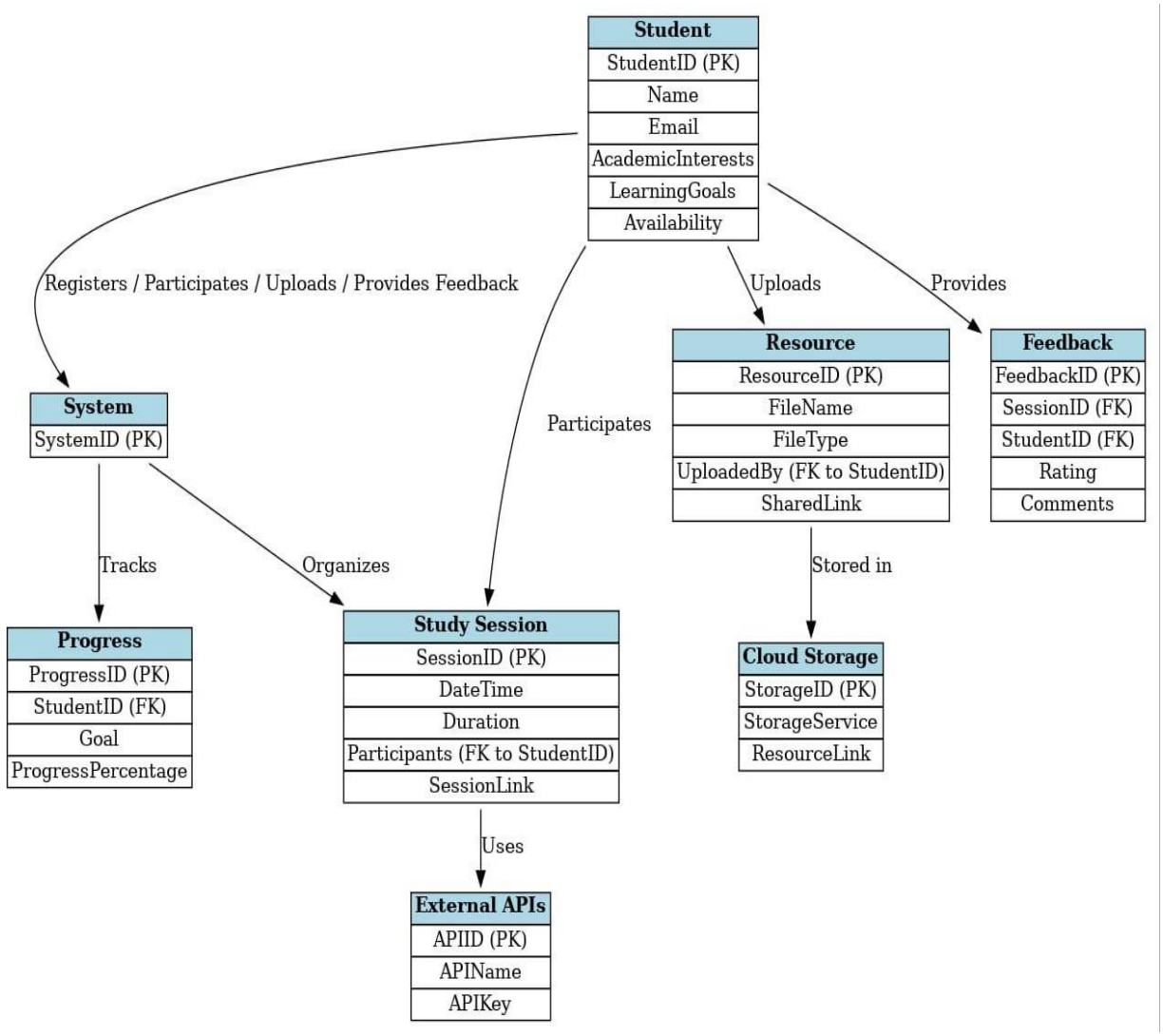
3. Anderson, T. (2003b). Modes of interaction in distance education: Recent developments and research questions. In M. G. Moore & W. G. Anderson (Eds.), Handbook of distance education. Mahwah, NJ: L. Erlbaum Associates.

4. Arum, R., & Roksa, J. (2011). Academically adrift: Limited learning on college campuses. The University of Chicago Press.

Appendix A
Data Flow Diagram (DFD)
(Mandatory)



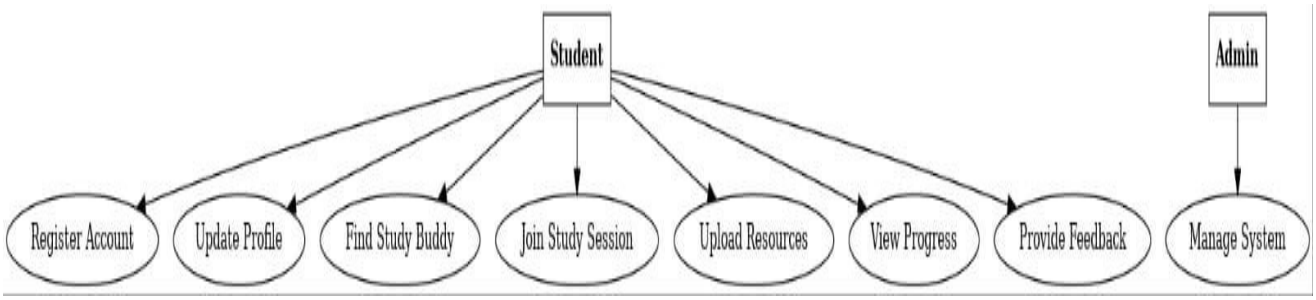
Appendix B
Entity-Relationship Diagram (ERD)
(Mandatory)



Appendix C

Use-Case Diagram (UCD)

(Optional)



Appendix D
Data Dictionary (DD)

(Mandatory)

Example:

User Table (USR)

Fields	Data type	Description
USR-Name	Text	Name of the user
USR-Email	Text	User's email address
USR-Password	Text	User's password
USR-Contact-No	Number	User's contact number

Study Session Table (STUDY_SESSION)

Fields	Data type	Description
SESSION-ID	Number	Unique identifier for the session
SESSION-DateTime	DateTime	Date and time of the session
SESSION-Duration	Number	Duration of the session (in minutes)
SESSION-Link	Text	Link for the video session
SESSION-Participants	Text	List of participants (User IDs)

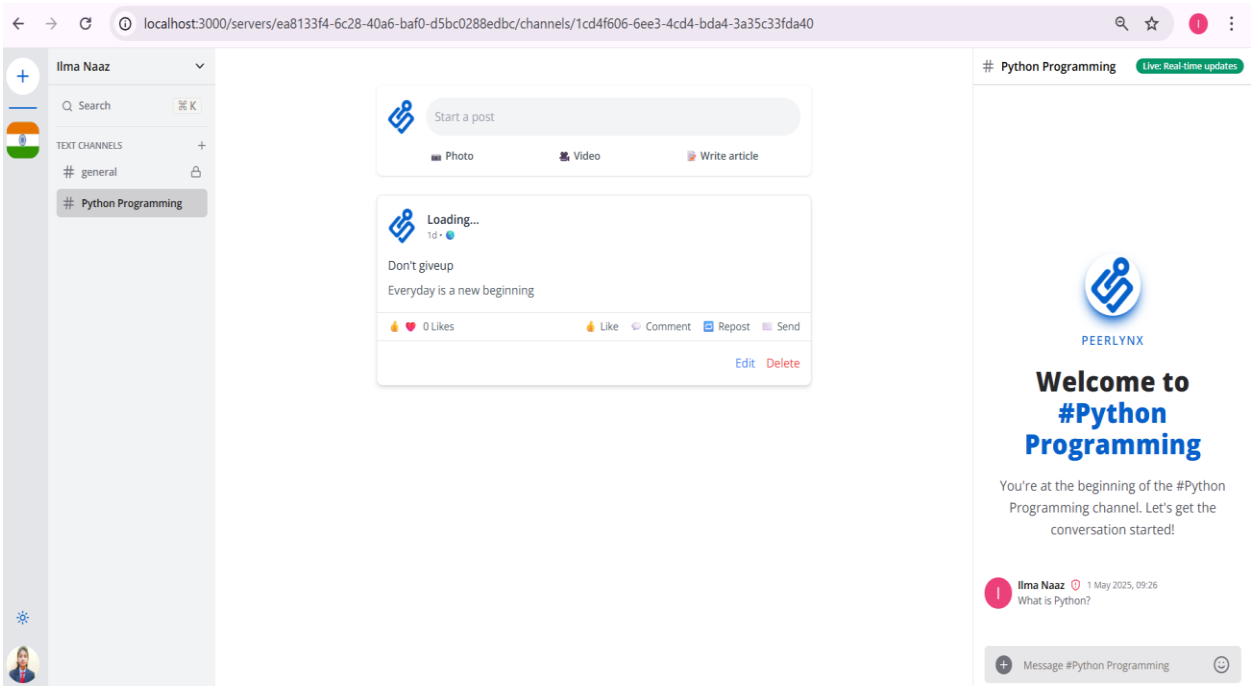
Feedback Table (FEEDBACK)

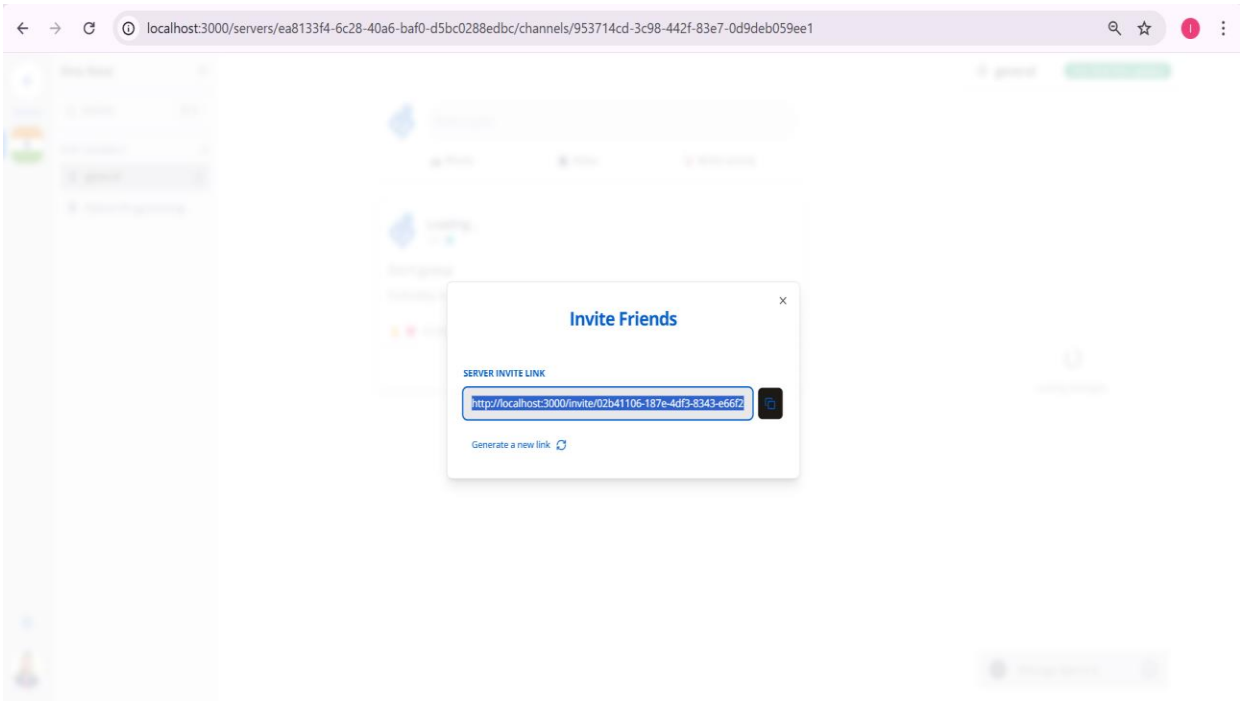
Fields	Data type	Description
FEEDBACK-ID	Number	Unique identifier for the feedback
SESSION-ID	Number	Linked session ID (Foreign Key to STUDY_SESSION)
USER-ID	Number	User providing the feedback (Foreign Key to USR)
RATING	Number	Rating provided (1-5)
COMMENTS	Text	Comments about the session

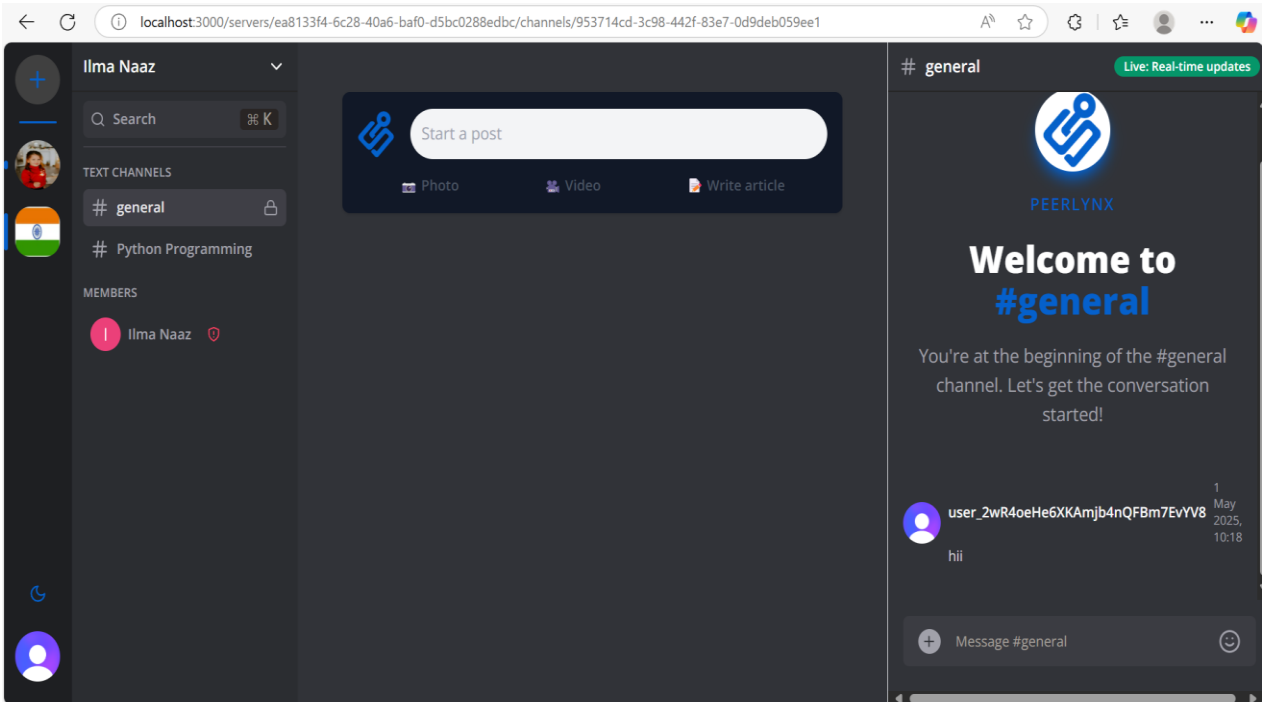
Appendix E
Screen Shots

<Guidelines: Show all Pages>

Home Page:



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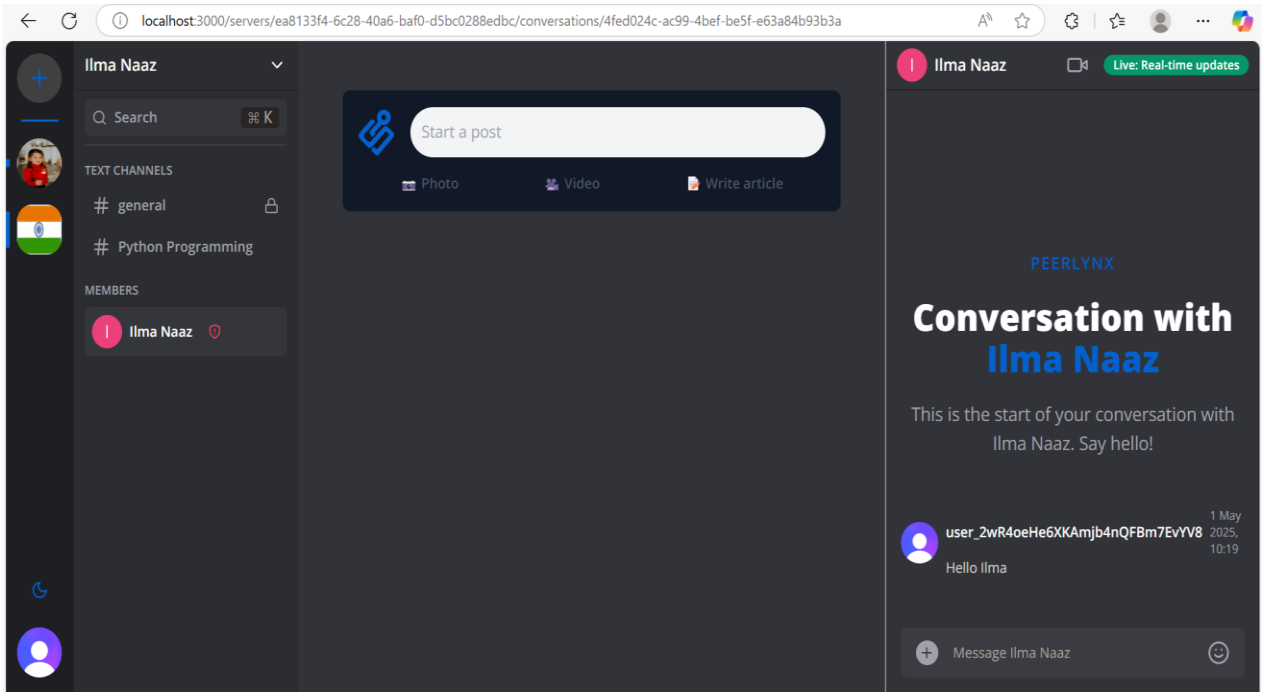
Ilma Naaz
Search ⌘ K
TEXT CHANNELS
general
Python Programming
MEMBERS
Ilma Naaz
Start a post
Photo
Video
Write article
general
Live: Real-time updates
PEERLYNX
Welcome to #general
You're at the beginning of the #general channel. Let's get the conversation started!
user_2wR4oeHe6XKAmjb4nQFBm7EvYV8
1 May 2025, 10:18
hii
Message #general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Ilma Naaz
Search ⌘ K
TEXT CHANNELS
general
Python Programming
MEMBERS
Ilma Naaz
Start a post
Photo
Video
Write article
Ilma Naaz
Live: Real-time updates
PEERLYNX
Conversation with Ilma Naaz
This is the start of your conversation with Ilma Naaz. Say hello!
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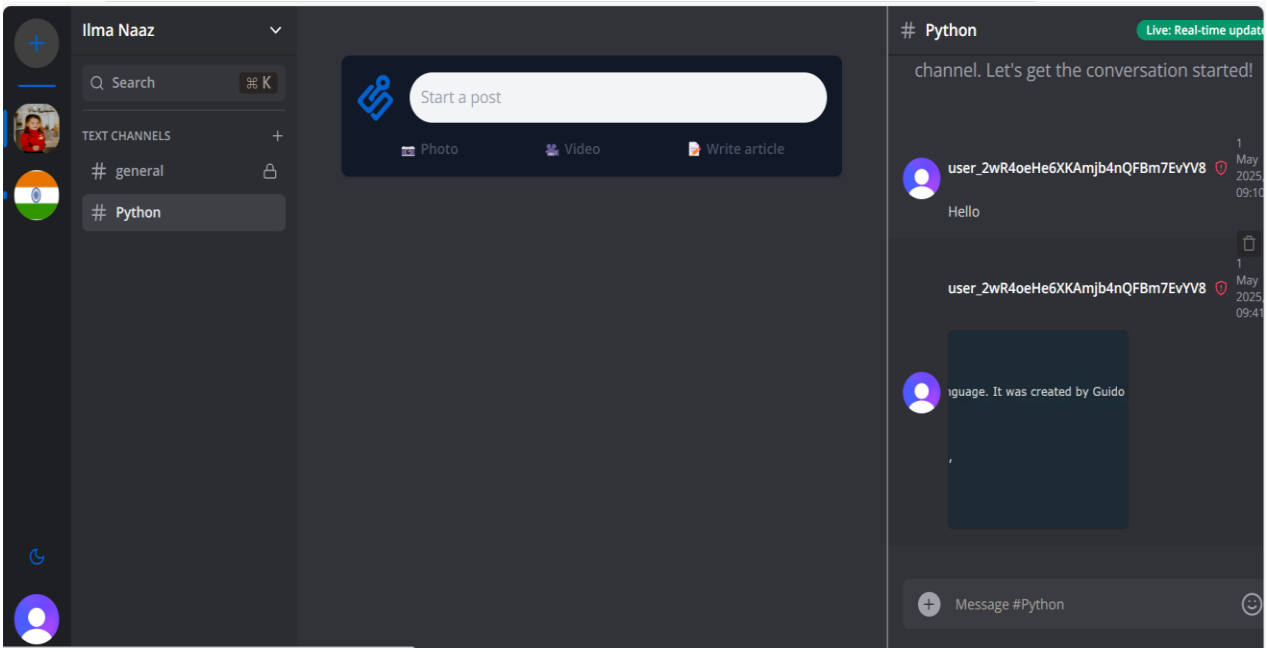
1 May 2025, 10:19
Hello Ilma
Message Ilma Naaz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TEXT CHANNELS
general
Python
Start a post
Photo
Video
Write article
Python
channel. Let's get the conversation started!
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Hello
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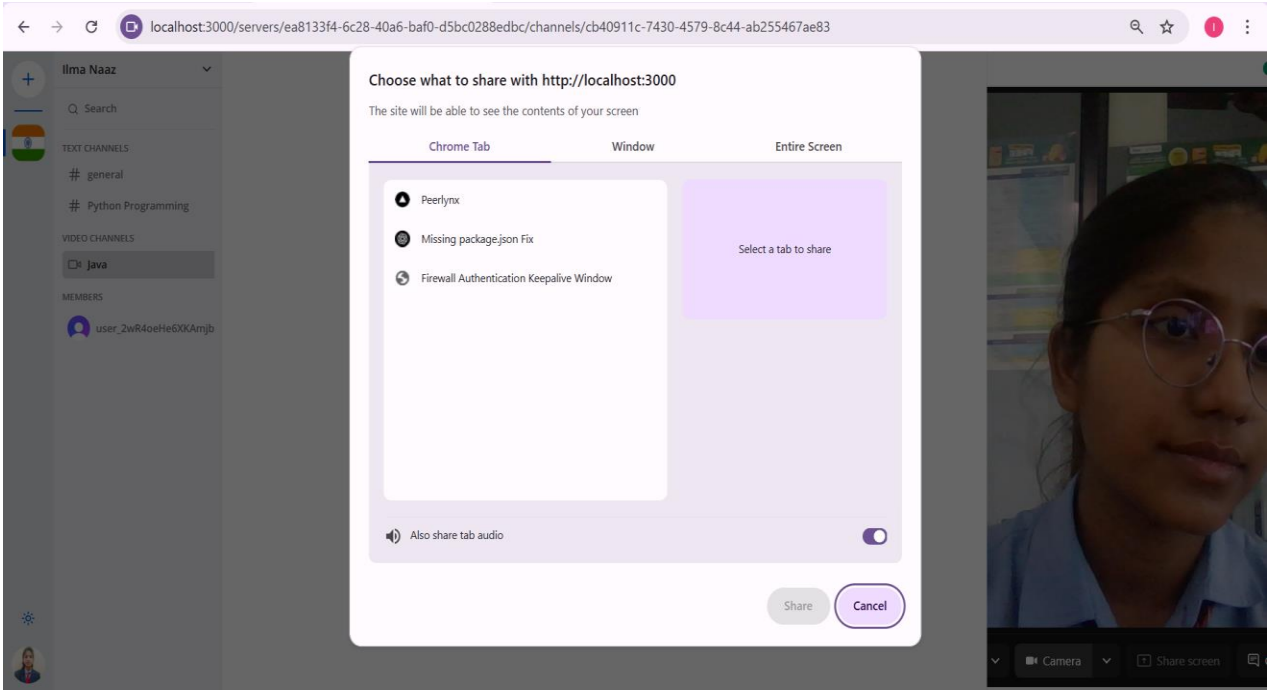
Message #Python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The site will be able to see the contents of your screen
Chrome Tab
Window
Entire Screen
Peerlynx
Missing package.json Fix
Firewall Authentication Keepalive Window
Select a tab to share
Also share tab audio
Share
Cancel